When the Future is not What it Used to Be: Lessons from the Western European Experience to Forecasting Education and Training in Transition Economies

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Executive Summary

In an era of rapid technological change, information exchange, and emergence of knowledge-intensive industries it is critical to be able to identify the future skill needs of the labour market. Growing unemployment in EU member states and pre-accession countries in Eastern Europe combined with technological changes which make the skills of a significant number of workers obsolescent each year demand adequate knowledge of medium- and long-term demand for specific skills.

Some EU members states have developed employment forecasting methods to identify future skill requirements which take account of the sectoral, occupational, and educational and training factors which influence supply and demand in the labour market for skills. A number of countries in Eastern Europe which are preparing to join the EU are interested in developing employment forecasting models that would provide them with similar information relating to skills.

Taking account of the requirements of the Single European Market and increasing international mobility, it is desirable that the pre-accession countries should develop models which, if possible, are comparable with existing methods of forecasting training and qualification needs in existing member states of the EU. This task requires regular medium-term forecasts which will extend the time horizon of decision makers beyond the current economic cycle, be applicable to the whole economy, allow speedy adjustment to changing circumstances, and which will take account of relevant factors such as investment plans, output and labour productivity forecasts, and technological change.

The objective of this paper is to provide a summary of existing methods and data sets used to forecast education and training needs in four members of the European

Union, in order to motivate similar work in three pre-accession countries. We first provide a detailed account of the different approaches to forecast education and training needs in France, Germany, Ireland and The Netherlands. For each of these countries, we consider the labour market data on which employment forecasts are based and the current methods in use, examine how data reliability and accuracy of forecasts are dealt with, and discuss the dissemination and usage of forecast information generated by those systems. We then look at the same range of issues for three pre-accession Central European countries (Czech Republic, Poland and Slovenia.) The paper concludes by suggesting a number of needed actions in preparation for developing an approach to forecasting education and training needs in the three pre-accession countries.

Keywords: Employment Forecasting, Education and Training Needs Forecasting, Labor Market, Transition.

List of Abbreviations

BIPE: Bureau d'Information et de Previsions Economiques, France

CEE: Central and Eastern Europe

CEREQ: Centre d'Etudes et de Recherche sur les Qualifications, France

CERGE: Center for Economic Research and Graduate Education, Charles University, Czech Republic.

CPB: Central Planning Bureau, Netherlands

CSO: Central Statistics Office, Ireland

Czech SO: Czech Statistical Office, Czech Republic

EI: Economics Institute of the Academy of Sciences of the Czech Republic.

ESRI: Economic and Social Research Institute, Ireland

ESS: Employment Service of Slovenia

EU: European Union

FAS: Foras Aiseanna Saothar, Ireland

HRDF: Human Resource Development Fund, Slovenia

IAB: Institute für Arbeitsmarkt and Berufsforschung der Bundesanstalt für Arbeit (Institute of Employment and Occupational Research, Germany)

INSEE: Institut National de la Statistique et des Etudes Economiques, France

OREF: Observatoires Regionaux de l'Emploi et de la Formation, France

ROA: Research Centrum voor Onderwijs en Arbeidsmarkt, Netherlands

RSSO: Republic of Slovenia Statistical Office

SN: Statistics Netherlands

Introduction

In an era of rapid technological change, information exchange, and emergence of knowledge-intensive industries it is critical to be able to identify the future skill needs of the labour market. Growing unemployment in EU member states and pre-accession countries in Eastern Europe combined with technological changes which make the skills of a significant number of workers obsolescent each year demand adequate knowledge of medium- and long-term demand for specific skills. Some EU members states have developed employment forecasting methods to identify future skill requirements which take account of the sectoral, occupational, and educational and training factors which influence supply and demand in the labour market for skills. A number of countries in Eastern Europe which are preparing to join the EU are interested in developing employment forecasting models that would provide them with similar information relating to skills. Taking account of the requirements of the Single European Market and increasing international mobility, it is desirable that the pre-accession countries should develop models which, if possible, are comparable with existing methods of forecasting training and qualification needs in existing member states of the EU. This task requires regular medium-term forecasts which will extend the time horizon of decision makers beyond the current economic cycle, be applicable to the whole economy, allow speedy adjustment to changing circumstances, and which will take account of relevant factors such as investment plans, output and labour productivity forecasts, and technological change. The development of such forecasts will require use of quantitative and qualitative methods which will systematically organise and integrate data and analysis relating to the education and training, sectoral, and occupational dimensions of skills.

The objective of this paper is to take stock of the labour market data and methods used to forecast education and training needs in four EU member countries (France (Giffard and Guegnard, 1999), Germany (Dostal, 1999), Ireland (Hughes, 1999), the Netherlands (de Grip and Marey, 1999)) and compare them with the current situation in three pre-accession countries (Czech Republic (Münich, Jurajda, Campos and Stryjecka-Ilyina, 1999), Poland (Kabaj, 1999), Slovenia (Luzar and Gerzina, 1999)). In addition it will summarise how the forecasts are made in the EU countries and consider what forecasting methods are likely to work successfully in the pre-accession countries. This will be done in three parts. The first part provides an overview of the factors which determine the different approaches which are taken to forecasting education and training needs in the four EU countries, consider the labour market data which are available for each country on which employment forecasts are based, examine the methods used to make employment forecasts in each country, look at the reliability of the basic data and how the accuracy of the forecasts is evaluated and present information on who the final users of the forecasts are and how the results of the forecasts are disseminated. The second part looks at the same range of issues for the three pre-accession countries. The paper concludes with suggestions about what issues need to be considered in preparation to develop an approach to forecasting education and training needs in the pre-accession countries.

Part I: Forecasting Models of Education and Training Needs in EU Countries

Brief History of Occupational and Educational Forecasting in Four EU Countries

France has the longest tradition of trying to regularly forecast occupational and educational requirements, the Netherlands comes next, and Ireland has only recently developed expertise in this area. Broadly speaking, occupational and educational forecasting has gone through two phases (see Hughes, 1991 and van Eijs, 1994). The first phase extended from about the end of the Second World War until the aftermath of the first oil crisis and the second phase covers the period from the early 1980s until the present day. France adopted a rigorous approach to economic planning with the publication of the First Economic Plan for the period 1947-50. This plan and the second and third plans for the periods 1954-57 and 1958-61 contained employment forecasts for sectors but not for occupations. An occupational breakdown was provided in the Fourth Plan for the period 1962-65 when forecasts were given for twenty sectors and six occupations. The objective of providing occupational projections was to establish if there were likely to be sufficient qualified people in each occupational group to achieve the goals of the plan.

In the first phase economists were concerned about the emergence of structural unemployment at a time when aggregate demand was quite strong. They were afraid there would be continuing shortages of qualified manpower in some areas (science, education, health) and surpluses of poorly educated workers in others (agriculture, building and construction). Analysis by Denison (1962) and others of the sources of economic growth identified the strong contribution which highly educated workers could make and this focused attention on the quality of the labour force. These developments stimulated demand for projections of the occupational and educational structure of the labour force by manpower planners and policy makers responsible for maintaining full employment and providing education and training facilities.

When employment in a particular occupation is growing, investment in the skills needed for the occupation is likely to be individually and socially profitable. Hence, current and planned training and education patterns should be skewed towards the growing occupations. Manpower planners argued in the early 1950s that occupational forecasts could play an important role in ensuring a smoother long-term adjustment of supply to demand in occupational labour markets, through educational planning procedures, than would have been possible by relying on market mechanisms alone. The manpower requirements method was developed by the United States Bureau of Labor Statistics in the 1950s to meet the need for evaluation of the future demand for labour. This approach was influenced by expectations of continuing economic growth and a strong belief in manpower planners' ability to fine tune the supply of labour coming onto the labour market from the educational and training systems to the occupational demand for labour by the production system. Evaluations at the end of the 1960s of the results of occupational forecasting models showed that such fine tuning was very difficult to do because the relationships between education, training, and occupation were far more complex than was assumed in the early projection models.

The projections which had been made for France for the 1970s in the fifth and sixth economic plans were blown off course by the first oil crisis because of the major occupational and sectoral transformations necessitated by the need to reallocate resources away from energy intensive industries. This poor performance of the forecasts resulted in a substantial modification of the role assigned to the educational system in balancing the supply and demand for different skills in the Seventh Plan. The Seventh Plan, for the period 1976-80, abandoned the confrontation of demand with supply "thereby rejecting any detailed normative analysis aimed at the school system" as Paul (1985, p. 50) notes.

Following this there was a period of considerable doubt in France about the wisdom of manpower and educational planning in a free-market economy in which many types of labour and education were in surplus. This resulted in the omission of any occupational forecasts from the Eighth Plan for the period 1981-85, a period also characterised by decentralisation, and such forecasts have not been included in any subsequent economic plans for France. Despite this there continued to be a demand for occupational forecasts for France and in 1987 the Minister for Social Affairs and Employment launched an initiative which brought together employers, trade unions, and professional associations at a Round Table on occupational training. This movement has led to the gradual transfer of major responsabilities for training and employment to regional authorities. In order to support this decentralisation (since 1982), tools of analysis and diagnosis have to be developed at regional level, so the Regional Employment and Training Observatories (Observatoires Regionaux de l'Emploi et de la Formation) were created. This framework consists of a central authority and regional observatories for the co-ordination of manpower forecasting activities on which employers, trade unions, and professional organisations are represented. These organisations have three main objectives:

(a) at the macroeconomic level, to provide a general framework for the analysis of medium-term occupational trends and the examination of alternative employment scenarios;
(b) at the regional level, to arrange contracts between the State and the regions which will allow the development of regional manpower forecasts;
(c) at the occupational level, to provide for forecasting study contracts (Contrats d'Etudes Previsionnelles) between the State and occupational interest groups which will permit a common approach to occupational evaluation by the public and private sectors.

The context within which these objectives are realised is that the forecasts are used to explore the implications of alternative scenarios for education and training needs, not to specify the needs of the economy for qualifications from which it will be possible to determine the volume of training. The new approach to forecasting education and training needs in France is to examine the conditions for coherence between a changing employment structure and the evolution of the training system. This requires a confrontation between two processes which are partly autonomous and partly interdependent (see Commissariat General du Plan, 1991).

In the Netherlands the government has a legal responsibility to provide adequate education for all individuals or groups for all levels of education. Hence, decision makers are obliged to try and anticipate the demand for education at different levels and to provide the necessary resources and educational facilities to accommodate this demand. This means that type of education as well as occupation has been a focus of employment forecasting in the Netherlands. The forecasts which were made for the Netherlands by the Central Planning Bureau up to the first oil crisis used the manpower requirements approach to produce estimates for four levels of education and four branches of study. These were too few categories to be useful to educational planners or to help individuals make educational or training choices. In the mid-1980s the Dutch Ministry of Education and Science commissioned the Researchcentrum Voor Onderwijs en Arbeidsmarkt, ROA (Research Centre for Education and the Labour Market) to develop an information system which would help individuals in the education system to make educational and vocational training choices.

The primary objective of ROA's approach is to provide information on current and future developments in educational and occupational labour markets which is representative and integrated with relevant information on the economy and which differentiates between different occupations and types of education and vocational training. This information is intended to increase the transparency of the match between education and the labour market thereby facilitating careers advisors and individuals in making educational and vocational choices. The lead time required from the provision of this information until individuals begin to emerge from the education and training systems with qualifications ranges from several years, in the case of vocational training, to four years, in the case of higher vocational and university education. Hence, the information system for the Netherlands is focused on providing data on future labour market prospects of different types of education and occupation, as Dekker, de Grip, and Heijke (1994) point out in their account of the forecasting models used by ROA. Since there are elements of risk for individuals in choosing a type of education, an occupation, and a sector to work in, ROA's labour market information system for the Netherlands provides a series of risk indicators on the cyclical sensitivity of employment in different sectors and occupations for individuals with particular education and training qualifications and which give information on the number and type of occupations which different educational and vocational qualifications provide access to.

Occupational forecasts for Ireland have only been published since 1993. The main objectives of the Irish forecasts is to provide information on the changing pattern of occupations and to identify possible changes in future skill requirements. A broad classification of sectors and occupations is used and the forecasts help to determine medium-term labour market strategies and to facilitate the planning of training by the national Employment and Training Authority (Foras Aiseanna Saothar – FAS).

Before 1993 a number of efforts were made to provide manpower forecasts for Ireland using the manpower requirements approach (see Hughes, 1991). Ireland participated in the work of the Educational Investment and Planning Programme initiated by the OECD Committee for Scientific and Technical Personnel in 1962. Medium-term projections were made for 7 occupational groups and 99 sectors but the results were never

published. In the 1970s similar projections were made for 16 occupational groups and 24 sectors by the Department of Labour but they were not published either. Following an initiative by the Minister for Labour the national Employment and Training Authority (FAS) entered into discussions with the Economic and Social Research Institute (ESRI) to develop an occupational forecasting system for Ireland. In May 1990 the ESRI and the Employment and Training Authority entered into an agreement to develop such a system and to produce regular occupational forecasts for Ireland. To date three sets of forecasts have been produced for the periods 1990-96, 1991-98, and 1995-2003.

Before the reunification of Germany occupational forecasts were made by a variety of organisations including trade associations, market research firms, and research institutes. The manpower requirements approach appears to have been first applied in the mid-1960s by Bombach (1965) to forecast the expected demand and supply for highly qualified manpower classified by education and occupation. The objective of these forecasts was to identify the kind of graduates the educational system should be producing. Official responsibility for labour market forecasting was given by the Employment Promotion Act 1969 to the Nüremberg based IAB (Institut für Arbeitsmarkt- und Berufsforschung der Bundesanstalt für Arbeit, Institute of Employment and Occupational Research at the Federal Institute of Labour). In the 1960s and 1970s there were lively debates in Germany between advocates of occupational forecasting who believed it could help to avoid mismatches of supply and demand and critics who argued that it is incompatible with the exercise of free educational and occupational choices.

This resulted in the adoption of a socially determined approach to the projection of labour supply and a manpower requirements approach to the projection of labour demand and the use of growth scenarios to tease out the occupational and educational implications of the forecasts.[1] The forecasts for Germany are principally intended for policy makers rather than career guidance officers or individuals. Hence, the policy role of the forecasts is dominant and little emphasis is placed on their role in informing educational or occupational choice.

Since the mid-1970s IAB has made forecasts in collaboration with the Battelle-Institute and subsequently with Prognos AG for 34 sectors, 60 branches of activity, and 8 graduation levels. The forecasts are made for branches of activity rather than occupation because of the desire of the forecasters to use them for policy purposes.

Role of Occupational and Educational Forecasts

It is clear from this brief account of the development of occupational forecasts in the four EU member countries that they now have two main roles - a policy role and an information role (see Hughes, 1994). Their policy role is to supply information on

[1] The socially determined approach to the estimation of the number of places required in the educational system is generally described as "social demand". The fact that this refers to the supply side of the labour market can be confusing.

employment trends for broadly defined occupational groups for the employment and training authorities. Their information role is to supply data on employment trends for a large number of occupational sub-groups and types of education and vocational training which will make the labour market more transparent for career guidance counsellors, school leavers, employers and others. These users are interested in having occupational forecasts for educational planning, and other, purposes so that the intake of students into different levels of education and training programmes can be regulated to ensure that excess demand or supply are minimised across the occupational spectrum. In the past it has proved difficult to match the supply of labour by education to the demand for labour by occupation with the degree of precision expected by educational planners because of the lack of a clear relationship between education and occupation, apart from professional and technical occupations for which specific educational qualifications are required. Development of new procedures for analysing the occupational domain of different educational and training qualifications by researchers at the Research Centre for Education and the Labour Market in Maastricht have made it possible for countries which have good data on the educational profile of occupations to consider producing more detailed estimates of excess demand or supply.

Whether the forecasts focus on the policy role or the information role will depend on a number of factors including the availability of data. The forecasts for Ireland are made for policy purposes primarily for two reasons (a) the lack of information on the educational and training qualifications of those at work classified by occupation and (b) the need to build confidence among users of occupational forecasts by providing broadly based information on current and expected future labour market developments. Forecasts for policy purposes provide information on the implications of existing employment trends, the current position in occupational labour markets, the kind of changes which can be expected, and the effect which different courses of action could have on the level and structure of employment in the future. This case is put by Wilson (1992, p. 52). He argues that the prime objective of occupational forecasts is:

> ...to provide a set of 'points of reference' for policy makers and other interested parties. These should indicate the sort of economic environment they are likely to face, highlighting the main problem areas, quantifying the scale of any difficulties that may be foreseen, and estimating the impact of different policies. [Such forecasts] provide a useful 'point of departure' for those interested in planning for the future. The alternatives are, on the one hand to rely on past data 'to speak for itself' or, on the other hand to reject all attempts at quantification. The former is extremely restrictive and rules out the consideration of major structural change. It also provides little or no insight into the reasons for past developments. The latter alternative denies the very real need of policy makers for some guidance on the likely size of the problems they may face.

One result of this approach is that occupational forecasters now argue that the forecasts should be seen as an aid to governments which can help in the development of more effective employment policies and in strengthening links between education and the labour market. They also argue that the forecasts have a role in helping decision makers in education and training, business, and the trade unions to respond intelligently to changing conditions in the labour market. Governments now use occupational forecasts to develop a wide variety of schemes to cope with unemployment. Education and training authorities use

them to take decisions on the provision of vocational and other training programmes, and businesses and trade unions use them to identify skills which could be in shortage or surplus.

Data

Table 1 provides summary information on the basic data which are used in each country to make forecasts of education and training needs. The four EU countries use quantitative data as the basis of their forecasts and they use trend projection or regression methods to make the forecasts. Their focus on quantitative techniques squeezes as much information as possible out of existing sources. It also means that there is no attempt to systematically incorporate qualitative data from labour market participants or from special surveys of sectors or occupations. This may exclude opinions on current labour market developments but it is the most cost effective and rigorous way to provide hard information on the labour market implications of the continuation of existing trends. The results are evaluated to see if they appear reasonable in the light of expectations about economic and labour market developments over the forecast period. In the vast majority of cases the forecasts produced by the projection models are accepted but there are usually a small number of cases where the results may be questionable. In these cases the researchers may select another regression equation to adjust the projection or they may impose an outcome in the target year which appears reasonable in the light of expected future trends.

In the case of Ireland and the Netherlands the basic data which are used as an input into the occupational forecasting models are provided by the Labour Force Surveys which both countries carry out in co-operation with Eurostat. The Labour Force Survey data for Ireland are supplemented by data on employment by sector and occupation from the Census of Population to furnish a perspective on occupational trends which minimises the effects of cyclical fluctuations. Data for France are provided by two surveys, the regular Employment Survey and the Training Vocational Qualification Survey, carried out by INSEE (the National Institute of Statistics and Economic Studies) in 1993. For France and Ireland similar data sources are used to provide information on the educational profile of occupations. For the Netherlands ROA has sources of information on the educational and vocational training systems using the Reference Forecasts of Flows of School-leavers carried out by the Dutch Ministry of Education, Culture and Science, the Educational Accounts maintained by Statistics Netherlands, and its own surveys of school-leavers, which include the RUBS survey of general secondary education and lower and intermediate vocational education, the HBO-Monitor of higher vocational education, and the WO-Monitor of university education. It is these sources of information on educational flows in the Netherlands which permit detailed analysis of the qualifications of the labour force and of new labour market entrants and which allow forecasts of occupational demand by type of education to be compared with forecasts of the supply of new entrants and re-entrants by type of education. This confrontation generates detailed qualitative information on labour market prospects by occupation and type of education.

Table 1: Data used to forecast educational and training needs in EU countries and available in CEE countries

	Data	France	Germany	Ireland	Netherlands
1.1	Type of input	Quantitative and qualitative	Quantitative + judgement	Quantitative + judgement	Quantitative + judgement
1.2a	Sources of data: Sectors	Employment Survey; Census (INSEE), Staff Turnover Statistics	Microcenzus 1985, 1995 W.Germany 1992, 1995 E.Germany Establishment Panel (6 in West G., 2 in East G., 1.6 establishments, 29 mil people), BGR	ESRI Medium-term model	ATHENA model of Netherlands Bureau of Economic Policy Analysis (CPB)
1.2b	Occupations	Training Vocational Qualification Survey, Job seekers statistics, Census	Microcenzus 1985, 1995 W.Germany 1992, 1995 E.Germany	EU Labour Force Survey (CSO)	EU Labour Force Survey (SN)
1.2c	Education & training	Census; Traininee Population Statistics;	BGR: The IAB Educational Accounting System, running since 1986, time lag ca. 2 years Based on specific surveys of educational and employment system	Census of Population & Labour Force Survey (CSO)	EU Labour Force Survey (SN); Reference Forecasts of Flows of School-leavers (DMECS); Educational Accounts (SN); Surveys of School-Leavers, RUBS, HBO-Monitor, WO-Monitor (ROA)
1.3	Sample or census	Both	Both	Both	Both
1.5a	Data period	15 years	11 years (1985-95) West Germany 4 years (1992-95) East Germany	1981, 1986, 1991, 1995	5-10 years
1.6	Contribution of irregular surveys	Young people starting working life (CEREQ); Sensitive jobs & obsolete skills (Quaternaire Education)	BIBB-IAB-Enquiry Performed in 1985/86 1991/92 current: 1998/99 Title: Qualification and their use in the employment system	Not used	Not used

HBO = Higher Vocational Education; RUBS = General Secondary Education and Lower and Intermediate Vocational Education; WO = University Education;

Note: The figures in the first column of this and subsequent summary tables refer to the number of the question which each country was asked to answer in

supplying information about data sources and forecasting methods. The source for this table is thus the individual country reports.

Table 1 (continued): Data used to forecast educational and training needs in EU countries and available in CEE countries

	Data	Czech Republic	Poland	Slovenia
1.1	Type of input			
1.2a	Sources of data: Sectors	Firm Census of Employment and Wages (Czech SO); Costs of Labour (Czech SO); Survey of Economic Units (Private firm + Min. of Labour)		Employment Survey (ESS); Survey of Company Training Needs - Podravje Region (HRDF) Survey of Companies (RSSO)
1.2b	Occupations	Labour Force Survey ; Business Survey ; Census of Population ; (All Czech SO)	Labour Force Survey ; Population Census; (All Polish SO)	
1.2c	Education & training	Register of Labour Offices ; School enrolment data (Min. of Ed.)	Registered Unemployment (Polish SO and National Labour Office); Survey of Labor Demand and Survey of Employment Graduates (All Polish SO)	Employment Survey (ESS); Survey of Company Training Needs (HRDF): ESS data base
1.3	Sample or census	Both	Both	Sample
1.5a	Data period	5-10 years	5-10 years	
1.6	Contribution of irregular surveys	First Destination of Third Level Graduates (Int. project); First Destination of School Leavers (National education fund): Labour Market Histories (Economics Institute);		

HBO = Higher Vocational Education; RUBS = General Secondary Education and Lower and Intermediate Vocational Education; WO = University Education;
Note: The figures in the first column of this and subsequent summary tables refer to the number of the question which each country was asked to
answer in supplying information about data sources and forecasting methods. The source for this table is thus the individual country reports.

The primary source of information for the German forecasts is the Mikrocenzus of establishments. To date six of these surveys have been carried out in West Germany during the period 1985-95 and three in East Germany during the period 1992-95. The survey is representative of 1.6 million establishments employing about 29 million people. The survey repeatedly surveys the same establishments so this panel dimension permits cross section and longitudinal analysis of the data. Some of the establishments participating in the survey undertake short- and medium-term human resource planning and information is collected about their future manpower requirements and their internal and external training activities.

In terms of the length of the period for which data is required to prepare occupational forecasts the ideal would be to have time series data with enough observations to enable modelling of the determinants of occupational and educational change to be carried out. Sufficiently long-runs of data are available for France and the Netherlands from their employment and labour force surveys to enable this to be done and the occupational and educational forecasts for the Netherlands use the results of such models. There is not yet a sufficiently long-run of data for Ireland from the Labour Force Survey to permit occupational modelling. The first published occupational

forecasts for Ireland were made by combining information on employment by sector and occupation from the Census of Population and Labour Force Survey to provide four data points. Trends in the occupational shares within sectors were then projected by extrapolation of the average annual growth rate or by regressing the occupational shares on a time variable.

The national sectoral employment forecasts for France produced by the BIPE DIVA model feed into the forecasting study contracts of about twenty occupational or professional interest groups which produce assessments of the qualification requirements of particular sectors at national and sometimes at regional level. At the national, regional, and sectoral levels, all the studies used data from INSEE, censuses, employment surveys, turnover surveys, data from CEREQ on training and qualifications and continuing vocational training in companies, irregular surveys for the relevant sector, and qualitative data incorporating insights from professional organisations, research centres, experts, and firms. A study of the chemical sector, for example, used survey information from CEREQ and Quaternaire Education for 20 firms on jobs and skills at risk from technological change. The approach which is used to make sectoral assessments is quantitative and qualitative. Experts knowledge of the sector is used to identify the professional categories in which those in the sector work. A qualitative analysis is then undertaken of each profession and forecasts are made of future qualification requirements.

The Regional Employment and Training Observatory for Burgundy (OREF-Bourgogne) analyses the implications for local areas of sectoral assessments. It translates qualification requirements of a particular sector into training needs by using population censuses, surveys of employment and staff turnover, regular surveys of the integration of trainees into local workplaces, job seeker statistics, and career surveys. It identifies factors which are likely to influence skill requirements and uses qualitative and quantitative scenarios to reach conclusions about the adjustments which may be required in the future. Training data is available by level of education, type of diploma, and speciality (basic subjects, technical-vocational field, personal development field). OREF-Bourgogne classifies the type of education and specialities into thirty training fields at the regional and local level.

Forecasting Methods

While there is considerable complexity in the forecasting models used in each of the EU countries they share a common quantitative approach based on manpower requirements and social demand models. This is illustrated in Table 2 and in the stylised flow-diagram in Figure 1. The four countries use a medium-term macroeconomic model which takes account of the domestic and international economic outlook to produce forecasts of employment by sector 6 to 10 years ahead of the base period. An occupational shares model is used to disaggregate historical data on sectoral employment by occupation and to project occupational shares within each sector to the target date. The occupational share forecasts are then multiplied by the sectoral forecasts to given

estimates of expected demand by occupation. Similarly an educational shares model is used to disaggregate historical data on occupational employment by level of education or vocational training and to project educational shares within each occupation to the target date. The educational share forecasts are then multiplied by the occupational forecasts to provide estimates of expected demand by education. This completes the demand side of the forecasts.

On the supply side models of the inflow of school-leavers and of the unemployed and those out of the labour force are used to project the number of individuals from each source with different types of education or vocational training who are expected to come onto the labour market in the target year. Summing the expected inflows from each source provides an estimate of the total number of individuals by type of education who are expected to be seeking employment in the target year. This completes the supply side forecasts.

The demand and supply forecasts are then brought together to identify which types of education or vocational training are likely to be in excess supply or demand in the target year. This information then enables the analyst to form a quantitative or qualitative view of labour market prospects by type of education in the target year.

The stripped down forecasting model in Figure 1 becomes more complex if other factors which influence the provision of employment are introduced. These factors include scenarios in which a number of different structural and other changes are allowed to occur, models in which the employment forecasts are broken into expansion demand and replacement demand, and models in which cultural and other changes are allowed to influence the social demand for education.

Of the four EU countries the forecasting method for Ireland is closest to the stripped down model. The forecasts are made for a 6 to 8 year period and are updated every two years. Estimates of expansion demand are given for 29 sectors and 45 occupational sub-groups. Although they are not an integral part of the Irish forecasts, the implications of occupational change for educational qualifications can be derived for broadly defined levels of education (see Canny and Hughes, 1994).

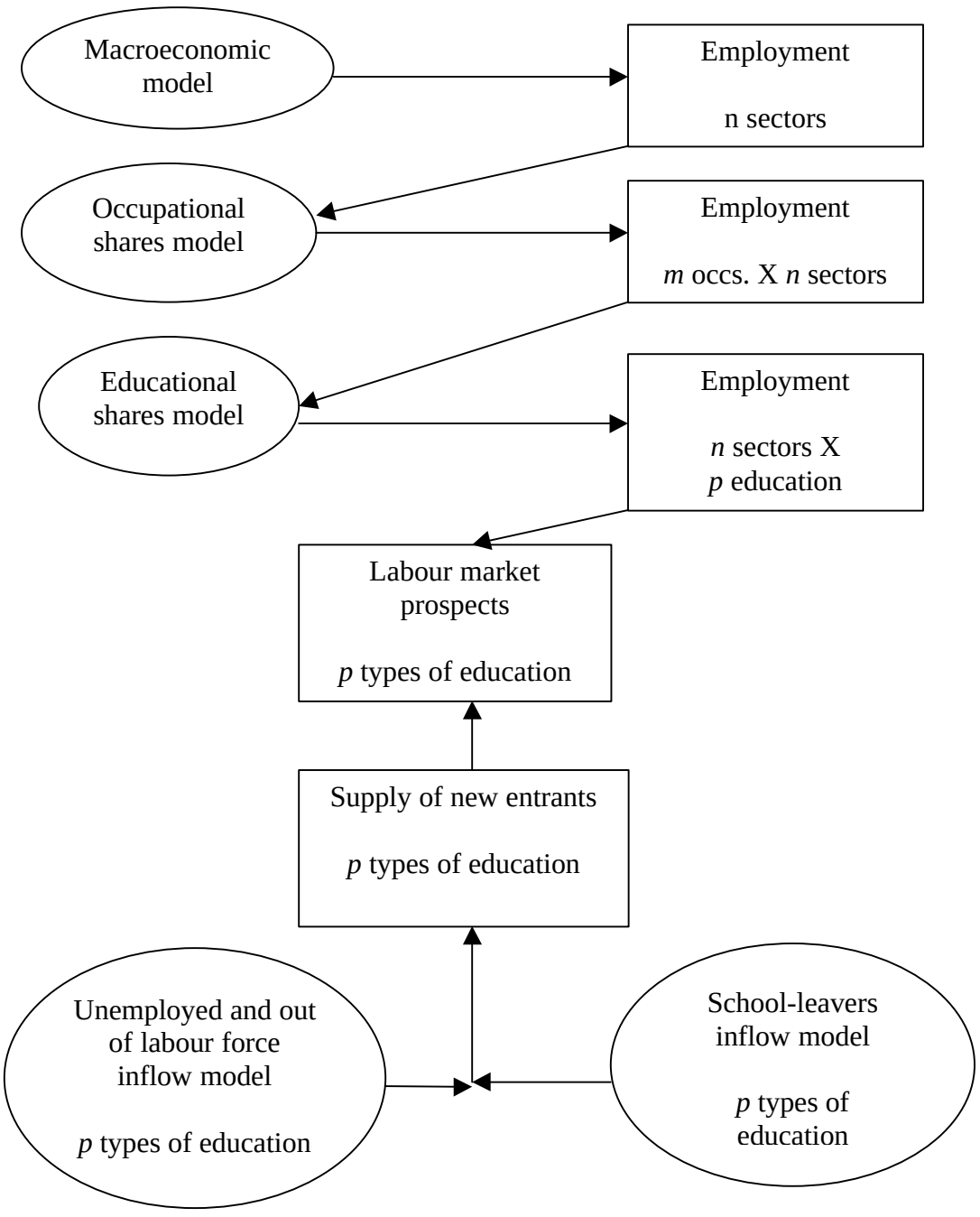
The national forecasts carried out by the BIPE (France) come next in terms of complexity. Estimates are made for 36 sectors and 14 professional categories. The professional categories used for the French demand side forecasts combine occupational and employment status characteristics. This means that they are not directly comparable with the occupational forecasts produced for Ireland and the Netherlands which are derived from the International Standard Classification of Occupations. The CALIFE model is used to disaggregate the professional categories forecasts by 10 levels of education. On the supply side BIPE produces forecasts of the supply of school-leavers for 5 diploma categories. In view of the difference between the number of education levels used in the demand side forecasts and the number of diploma categories used in the supply side forecasts it is not clear how the demand and supply sides of the forecasts are brought into confrontation to form a view of employment prospects by level of education.

IAB in Germany uses an Educational Accounting System (BGR) to provide information on stocks and flows of people in the education and training systems, in employment, unemployment and outside the labour force. This system permits analysis of transitions between different labour market states. It is supplemented by a model, ENTROP, based on the principle of entropy optimisation which uses the input-output RAS method to integrate heterogeneous transition data. The major difference with the RAS method is that qualitative as well as quantitative information can be taken into account in transition analysis.

Table 2: Methods used to make forecasts in EU countries

	Method	France	Germany	Ireland	Netherlands
2.1	Approach	Manpower Requirements	Manpower Requirements	Manpower Requirements	Manpower Requirements and Social Demand
2.2a	Forecast period	10 years	11 years	8 years	6 years
2.2b	Target year	2005	2010	2003	2002
2.3	Updating	Irregular	6-8 years	2 years	2 years
1.4a	Sector x occupation	36 x 14	40 x 38	29 x 45	13 x 127
1.4b	Occupation x education	14 x10	38 x 12	45 x 5	127 x 104
2.4 b	Expansion demand	14 professional categories	No demografic calculations for the demand disaggregation	45 occupations	13 sectors 127 occupations 104 education types
2.4c	Replacement demand		See above		127 occupations 104 education types
2.4d	Job openings		No consideration of the flows on the labour market		127 occupations 104 education types
2.4e	Supply of graduates	5 diploma categories	BGR 12 categories		104 education types
2.4f	Information provided	No. of young workers required; No. of young people available with 5 diploma categories;	Aggregated demand for the above categories: Occupations Sectors Qualification levels In total numbers without consideration of the demografic changes	No. of workers required	5 point indicator of future labour market situation for 104 education types 5 point indicator of future risks of labour recruitment problems for 104 education types 5 point indicator of occupation switching opportunities for 104 education types 5 point indicator of sector switching opportunities for 104 education types 5 point indicator of employment sensitivity to cyclical changes for 104 education types
2.5	Min. cell size		300 persons		Random coefficients model allows pooling of data

Figure 1: Stylised Flow-diagram of Occupational and Educational Forecasting Method



Forecasts of employment in Germany in 2010 are provided by a comprehensive model. In an ex-post analysis the effect of influencing factors – technological, economic, social and others – on branches of activity are assessed. Qualitative factors are described and their impact is classified as positive (increase of employment in a branch of activity) or negative (decrease of employment in a branch of activity). The expected impact is based on empirical analysis of past trends and forecasts of future trends. The results are standardised and transformed from a cardinal to an ordinal measure. Matrices of sectors and branches of activity are the basis for the extrapolation. The trend is projected and modified to take account of the influencing factors. Three variations are possible. The trend is accepted or it is increased or decreased. This gives a range of forecast results. In addition the forecasts by branch of activity are disaggregated in a parallel analysis to provide forecasts of the demand for skills. The current model uses a multivariate approach which is still in the course of development.

The most complex and detailed forecasts are produced by ROA for the Netherlands. It uses manpower requirements and social demand models to make projections for 6 years ahead which are updated every two years. Forecasts of expansion demand are made for 13 sectors and 127 occupations and expansion and replacement demand forecasts are made for 127 occupations and 104 types of education. The inclusion of replacement demand forecasts means that estimates can be made of the total number of job openings there are likely to be in the target year. Information on job openings is particularly useful for training purposes. Given the scale of retirements and withdrawals for other reasons from the labour force, replacement demand for many occupations and types of education can considerably exceed expansion demand. Hence, the total demand for particular types of education and vocational training can be greatly in excess of the demand indicated by expansion demand forecasts. In order to generate replacement demand forecasts models of replacement demand by occupation and educational qualification are added to the expansion demand models used by ROA. The production of replacement demand forecasts can require considerably more data than forecasts of expansion demand because of the age and labour market flow dimensions. However, stock data are used to derive net flows thus lowering the data requirements. On the supply side social demand models are used to provide forecasts of the expected supply of new entrants and reentrants to the labour market in the target year for 104 types of education.

The demand and supply forecasts for the Netherlands are brought together at the end of the two stages of the forecasting process to provide a view of labour market prospects by educational qualification. These views are based on a quantitative assessment but they are presented in qualitative terms. This is because most of the information individuals require to choose a type of education in the light of labour market prospects can be given qualitatively. Presenting information on employment prospects in this way has the advantage that it does not imply a greater degree of accuracy than is warranted by estimates based on sample surveys and the errors which are an inherent part of any forecasts.

Neither of the forecasting models for France and Ireland specifies a minimum cell size for the basic data required to make the forecasts. However, small cell sizes are unlikely to pose problems for these countries forecasts since they are made at such a high level of aggregation. They could pose problems for ROA's forecasts because they are made for a large number of occupations and types of education. However, the problem of unreliable data in some cells is minimised by pooling it and using a random coefficients model to make the forecasts for the Netherlands.

Forecasts for the Limburg region around Maastricht are made by ROA but there are no regional forecasts for Ireland. BIPE does not produce regional forecasts for France but the French Regional Employment and Training Observatories use the national forecasts as an input into their work at regional and local level.

Evaluation of Data and Reliability of Forecasts

Key questions for anyone wishing to produce occupational and educational forecasts are: how reliable are the basic data used to make the forecasts and how accurate are the forecasts?

In the case of all four EU countries the quality of the basic data is guaranteed by the institutions supplying the data (see Table 3). These institutions are national statistical offices, government departments and research institutes which have a long tradition of producing high quality labour market information. The labour market data is closely scrutinised in all four countries for consistency between different data sources (e.g. Census of Population and Labour Force Survey) and adjusted if required. Thus, the data for Ireland and the Netherlands are adjusted periodically to take account of revisions to sectoral, occupational, or educational categories to provide consistent data series.

The sector, occupational and educational categories used in all four EU countries either reflect classifications used by the national statistical offices in presenting their data or classifications which are of particular interest to users of the forecasts.

It is evident from the history of occupational forecasting in the four EU countries that forecasts can be seriously blown off course by unexpected shocks such as the two oil crises experienced in the 1970s. In the face of such major shocks the best thing to do is to take a leaf out of macroeconomic forecasters' book and to revise the forecasts to take account of the new developments. In the case of lesser shocks the use of a medium-term perspective rather than a short-term perspective minimises the impact of cyclical fluctuations in all four countries. The forecasts for the Netherlands incorporate a five point indicator of the sensitivity of 104 types of education to cyclical changes in employment in each sector.

The most thorough evaluation of the performance of occupational and educational forecasts in the four EU countries is that undertaken for the Netherlands forecasts for 1992 by Borghans, van Eijs, and de Grip (1994). They assessed the forecasts for 79

occupational classes and 53 types of education by evaluating how useful they were to the average individual choosing a course of study or occupation. They used the squared difference between the outcome and the forecast for each occupational and educational category relative to the outcome to permit an average loss to be calculated for each category. The forecasts for each sector, occupation (expansion and replacement demand), type of education (expansion and replacement demand) and labour market indicator were scored by relating them to a reference forecast. The reference forecast indicates the situation students would have faced if no forecasts had been available to them. In such circumstances it is assumed that choices would have been based on the current labour market situation. Since there would have been no change between the base year and the target year the reference forecasts are referred to as the Same as Before forecasts. A score greater or less than 1 indicates that the forecast for a particular category is worse or better than the reference forecast. The evaluation study for the Netherlands concluded that:

> "the score … shows that the loss in the forecasts of expansion demand per occupational class is not exceptional. In comparison with the reference forecast, the prediction of the expansion demand is thus no worse than other components of the forecast model. The score of the point forecasts for most components could be said to be mediocre. The value is generally somewhat lower than [1] which implies that the forecasts are only a little better than the reference forecast. … There is also a clear reason for the moderate quality of the forecast of expansion demand per occupational class: the lack of a trend in most of these forecasts. The table shows that if the forecasts for economic sectors had been distributed over the occupational groups using the correct structure matrix for 1992, the score for the forecasts for occupational classes would have been 54%. The score for those occupational classes for which a trend variable was incorporated in the forecasts was 47%." (Borghans, van Eijs, and de Grip, 1994, p. 99).

There is no information on how the forecasts which BIPE produced for France for the period 1984-94 performed but assessments of earlier forecasts made by the Commissariat General du Plan for the period 1966-70 and 1971-75 suggest that the mean absolute percentage error in the forecasts was about 10 per cent. This meets the standard of accuracy used by the U.S. Bureau of Labour Statistics in evaluating its occupational forecasts. It is clear from evaluations of occupational forecasts in France, Canada, the United States, and the Netherlands that the average forecast error increases as the number of occupational groups increases. This is one reason why some countries use a relatively small number of occupational groups in making their forecasts. While quantitative accuracy is, of course, desirable it is not the only measure which should be employed in assessing the performance of occupational and educational forecasts. A qualitative indicator of the direction of change may be very useful. The forecasts for the Netherlands use such indicators and the National Careers Guidance Information counsellors have found them very helpful in diagnosing the employment position and employment prospects for a wide variety of courses of study (see Hughes, 1994). In Germany the forecasts were evaluated regularly until the German unification. Ten years after this event, the current development reached the former path.

Table 3: Evaluation of data and reliability of forecasts

	Method	France	Germany	Ireland	Netherlands
3.1	Data	Quality guaranteed by supplier at regional and national levels	Quality guaranteed by supplier	Quality guaranteed by supplier; Consistency checks; LFS data revised after each Census	Quality guaranteed by supplier; Consistency checks
3.2	Forecast reliability		Comparing former forecasts with real development	Compare forecasts for occupations with actual outturn	Detailed comparison and evaluation of all forecasts are made regularly and the results are published;
3.3	Sensitivity to data revisions		Data revised to provide consistent definitions	Data revised to provide consistent definitions	Time series revised to provide consistent definitions
3.4	Stratification of vocational training		The education in the dual system is incorporated in the labour market from the beginning	Sector classification reflects industry groups used by national training authority	Educational classification reflects different levels of vocational training; Group types of education with similar occupational domain;
3.5	Sensitivity to shocks		Experience of German unification used to assess sensitivity	Choice of forecast period minimises effects of shocks	5 point indicator of employment sensitivity to cyclical changes provides guidance for 104 education types
3.6	Regions	National forecasts used by regional OREF	No experience except East/West Germany	No regional breakdown	Forecasts made for one region (Limburg)

Only a preliminary assessment has been carried out of the performance of occupational forecasts for Ireland. It shows that the average forecast error for occupational groups was less than 10 per cent while the sectoral forecasts were also broadly accurate, although there was a significant underestimation of employment in services.

Dissemination and Users of Forecasts

Summary information on the users of the forecasts in the four EU countries is given in Table 4. The users are largely determined by the purpose for which the forecasts are made. In France and Ireland, where the forecasts are intended to give a broad brush picture of likely developments in skill requirements, the users are the ministries of employment and education, the authorities responsible for industrial and regional development, and employer and trade union organisations. They may also be used by career guidance advisers in the absence of more detailed forecasts which they would like for types of education. The French forecasts are also used as an input into sectoral studies by organisations responsible for employment and training at regional and local level. The forecasts for the Netherlands are used by the ministries of education, social affairs, economic affairs, and health. The National Careers Guidance Information Centre makes extensive use of them in the information products which it produces to help

school-leavers make informed educational choices. Most of those who use the forecasts in the four EU countries are active participants in the labour market.

Table 4: Dissemination and role of users of forecasts

	Method	France	Germany	Ireland	Netherlands
4.1	Final users	Ministry of education; Educational and vocational guidance officers; Professional branch of metallurgy sector; Regional institutions (regional council);	State and school administration, employers, human resources administrators, trade unions, students, parents.	Employment and Training Authority; Department of Enterprise and Employment; Department of Education; Industrial Development Authority; The Policy and Advisory Board for Industrial Development in Ireland;	Ministry of Education; Ministry of Social Affairs; Ministry of Economic Affairs; Ministry of Agriculture; Public Employment Services; National Careers Guidance Information Centre (LDC); Educational and vocational guidance officers; Educational institutes; Personnel managers; Advisory Councils;
4.2	Channels	BIPE reports; OREF reports;	CD and WWW	FAS/ESRI reports	ROA reports; LDC information products (Traject Series (CD-ROM), Occupation and Work Series, The Labour Market Newspaper of the Netherlands, Chances of Finding Employment in 2002)
4.3	Users role	Active	Passive	Active/Passive	Active

All of the forecasts in the four EU countries are published in reports issued by the organisations responsible for making the forecasts. These reports receive extensive coverage in newspapers and on radio and television and the authors of the reports are frequently asked to present their work to a range of organisations which have a particular interest in education and occupational employment.

Part II: Forecasting Models of Education and Training Needs in CEE Countries

Introduction

The main conclusion that emerges from comparing the Czech Republic, Poland and Slovenia (Münich et al., 1999; Kabaj, 1999; and Luzar and Gerzina, 1999, respectively) is that these three countries are in very distinct situations with respect to their forecasting systems for labor market qualifications and training needs. Because of extremely low rates of unemployment until very recently, *inter alia*, there is not only no forecasting system in place in the Czech Republic, but also a less clearly defined intention by the government to build one up. In Poland, the government has explicitly recognised the need for such a system to be in place and is taking appropriate measures. The government has set-up a high-level expert team, which assessed four different

methodologies and tested them in pilot studies in a few Polish regions. In Slovenia, attempts to anticipate the need of forecasting systems cover the most problematic and industrial, Eastern, part of the country (the Maribor region). Although coverage is regional, employment forecasting in Slovenia seems to be at a more advanced stage than in the Czech Republic or Poland. This disparate situations largely dictates the content of the information that follows.

Data

The Employment Service of Slovenia (ESS) is the only institution which has systematically recorded training needs at the national level. The paper indicates the existence of other initiatives, such as the regional survey on training needs in Podravje Region, carried out by the Human Resource Development Fund (HRDF) in Maribor.

Companies provide yearly data voluntarily to the ESS Employment Plan survey. It is noted that the employers consider the survey a rather formal, and traditional, obligation. The data includes figures for employment in the preceding and following year by level of education, expected retirements, planned openings, and on lack of workers with specific vocational qualifications. This is complemented with data on employment, registered unemployment, structure of registered unemployment, and unemployment rates, also gathered by the ESS on a regular basis.

Data on the training needs of the companies that the HRDF is collecting irregularly (but plans to do so regularly in the future) includes data on previous education and training in the company, on existing training programs, planned vacancies, investments in human resource development in the company, data on future skills and qualifications required by companies. The data are collected by industrial branches.

Because there is currently no regular forecasting of occupational and educational needs on the labour market done in the Czech Republic, the paper surveys the data sources most likely to be suitable for such forecasting and also notes those which are deemed not currently usable, but could be readily amended to serve forecasting purposes.

Among regular data sources, the paper discusses the following Czech Statistical Office outputs: the quarterly Labour Force Survey, the monthly and quarterly registered unemployment data, business surveys (which are deemed not currently usable for forecasting occupational and educational needs), and firm census data. In addition, the paper notes that the Ministries of Education and of Labour also produce regular, potentially useful, data sets on school enrolments and on unemployed graduates. Among irregular sources, the paper notes the Faculty of Social Sciences' survey of "Success of Tertiary-level School Graduates," the National Training Fund's OECD project of school leavers, and the Economics Institute's survey of Labor Market Histories. Finally, the International Adult Literacy Score Surveys have been administered in the Czech Republic and Poland. While not of special use for forecasting, these surveys provide

evidence on the quality and distribution of cognitive skills and the impact these have on labour market outcomes for individual workers.

Methods, Evaluation of Data and Reliability, and Dissemination and Users

In Slovenia, the outlooks produced by the ESS are up-dated once a year (and are made for a year ahead). They are mainly for quantitative measures, such as planned new vacancies of workers (for indefinite and definite periods of employment), by vocational qualification and formal education attainment. The time frame of the Slovene HRDF survey is from one to five years and plans are that some of the information will be annually updated (e.g., training needs and skills.) The outlooks cover both quantitative and qualitative aspects. Forecasts are for planned new vacancies, new specific requirements due to technological development by occupation and by branches, required development of new tailor-made training programs and other development projects, unemployed, redundant workers and management. The forecasts are made on a regional level and by branches of economic activity.

The Czech paper discusses a number of existing data that can be, but are not currently, used for forecasting of occupational and educational needs on the labour market, like demographic forecasts which are available and regularly updated. The Ministry of Labour employs a simple time series model developed by CERGE to forecast registered unemployment at national, regional and district levels (these forecasts are updated monthly). Finally, the Ministry of Education uses a simple model to describe the acquisition and utilisation of professional skills in the national economy. Future demand factors, capacity of educational system and student demand are taken into account. Later, the labour market is modelled using Human Resources Accounting. The forecasts are used mainly for financial planing of the education budget.

In Slovenia, the reliability of data is checked by the response to the survey (size and structure of it) and by public discussions of the results. The reliability of the resulting figures is not checked for differences or changes in basic input series. In dealing with stratification of the vocational training in Slovenia, the paper notes that the data on qualifications are based on formal education attainment levels (the national coding system is used) and vocational qualifications. However, the education data collected are of a formal character, and additional data on functional knowledge or special skills are not collected. The reliability of the forecasts to shocks and prolonged labour market adjustment is also checked against the responses to the ESS survey. In the case of the HRDF survey, reliability is checked by discussing the results with social partners and companies at "round-tables." In the future, the paper mentions plans to increase the number of participants (different target groups).

The final users of the ESS's Employment Plan Survey in Slovenia include: national, regional, and local employment services, national and regional offices of the Chamber of Crafts and the Chamber of Commerce and Industry, Ministry of Education

and Sport, Ministry of Labour, Family and Social Affairs, individual employers or their associations, some training providers, and the Centre for Vocational Education and Training. The channels of dissemination are reports (national and regional), round tables, and press conferences. It should be noted that until the 1999 exercise, most of the final users, with the exception of the ESS offices, have had a predominantly passive role. From 1999 on, the new procedure is that representatives of employers (Chamber of Craft, Chamber of Commerce and Industry) will have an active role both in checking the questionnaire itself and in discussing the results of the survey.

The final users of the HRDF survey are: the HRDF itself, regional Chambers of Commerce and Industry, Chambers of Crafts, ESS, MOLFSA, trade unions, employers, local communities, development agencies, training providers and other institutions involved in HRD. Channels of dissemination are round-tables, articles in newspapers, and reports. The Slovene papers notes that most final users have an active role in the labour market.

Part III: Summary and conclusions

The approaches of the four EU countries to forecasting qualification and training needs differ in terms of (a) the purposes for which the information is provided, (b) the number of occupations and levels of education and vocational training for which the forecasts are made, and (c) their focus on the demand or supply sides of the labour market. Thus, the forecasts for Ireland are made for policy purposes, for a relatively small number of occupational sub-groups, and to give quantitative estimates of the medium-term expansion demand for labour by occupation and level of education. The same is broadly true of the national forecasts for France and Germany. However, the demand side forecasts for these countries are supplemented by supply forecasts which enable comparisons to be made of supply and demand by broadly defined level of education and vocational training.

The forecasts for the Netherlands are made for career guidance purposes, for a relatively large number of occupational sub-groups and types of education and training, and to give quantitative estimates of the number of job openings by occupation and type of education and vocational training. The Dutch forecasts are focused on making the labour market more transparent so that individuals will have access to information that will enable them to choose courses of study based on an informed assessment of what job prospects are likely to be when they expect to graduate. These differences in the purposes for which the forecasts are made, the number of occupations and types of education, and labour market focus are strongly influenced by the data which are available, by different views on the accuracy of forecasts for large numbers of occupations and types of education, and by the purposes for which the forecasts are made. The fact that the forecasts for France, Germany, and Ireland are made for 2 to 3 times as many sectors but for less than one-third as many occupations as those for the Netherlands clearly reflects different views about the purposes of the forecasts and

ROA's view that distinguishing between a modest number of sectors enables it to distinguish between a considerable number of occupational groups.

Despite these differences in purpose, scope, and focus all four EU countries share a common approach to occupational forecasting which could be developed by the pre-accession countries to meet their particular needs if the data required are available. The critical requirement is that reasonably detailed information is needed on the demand for labour by sector and occupation and type of education and, if possible, on the supply of labour by type of education. Ideally such data should be available for a sufficient number of data points to allow identification of (a) trends in occupational shares within each sector, (b) trends in educational shares within each occupation, and (c) trends in course choice by type of education and training.

One of the major differences to be borne in mind in considering applying the standard forecasting method used in the EU countries in the transition countries is the extent of the restructuring which has occurred in these formerly planned economies. Whether data on changes in the structure of employment recorded in the first few years of transition (the only data yet available) provide a reasonable basis for estimating future trends is one of the major questions which has to be answered. Specifically, does the relatively short length of most time series for the pre-accession countries pose a major problem and do the frequent changes in statistical method render many of the existing labour market indicators unreliable? It is, therefore, important to establish which data are available and to develop a step-wise development of the forecasting method. It should be noted that the ideal in terms of data requirements is rarely met when countries are starting to make occupational forecasts. The Irish experience shows that useful information can be produced on the basis of a small number of data points. The first occupational forecasts which were published for Ireland were based on only four observations from three population censuses and one labour force survey and the data incorporated a significant revision of the occupational classification. The experience of IAB in using entropy optimisation in collaboration with Prognos AG in Switzerland to develop adaptation scenarios for East Germany may also provide useful guidance for the pre-accession countries. This approach shows how occupational forecasts based on limited data could be made for transition countries which are facing considerable demographic change, global economic change, new technologies, and changes in work organisation and the policy environment. In addition it is worth noting that the process of making occupational forecasts can lead to the generation of better labour market information as the authorities become aware of the many uses to which such forecasts can be put.

The state of occupational and skill forecasting in the three transition economies is very diverse, so are their future plans and requirements. Given the nature of the data collection and existing approaches discussed above, the Czech Republic seem would benefit more from the quantitative approach to forecasting used by ROA (Netherlands) and ESRI (Ireland), while the French approach would be more appropriate in the Slovene situation.

One of the important messages of this paper is that most of the necessary databases are indeed available. In general, however, they exist independently of each other because labour market information is collected by different agencies which are responsible for monitoring employment, unemployment, and education and training. Systematic integration of the information collected by these agencies would add considerable value to existing data, close information gaps, and facilitate the analysis of a wide range of labour market issues.

This paper has shown that the existing data in the pre-accession countries indeed allows for forecasting methods of the EU-type to be implemented. What is needed to achieve this is to show that links exist, or can be created, between different data bases which will enable occupational and educational forecasting to be undertaken. Hence, it is important to clarify if the data for the CEE countries on the occupational structure of employment are linked to (a) data on employment by sector and (b) employment by type of education and if the data on school-leavers and other labour market entrants classified by level of education are compatible with the classification of occupational employment by type of education. The three pre-accession countries appear to have data which have some or all of these links and all three have labour force surveys which might facilitate the development of such links. In future research one should explore how best to use data from labour force surveys to develop forecasts of education and training needs at national level in the Czech Republic, at regional, and possibly national, level in Poland, and at regional and sectoral levels in Slovenia.

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